

ratus is considerable, the corks by which these tubes are fixed must fit very tightly.

In using the arrangement the bottle is filled with water, the jet is then closed with the finger, and the funnel, which should be supported on the ring of a retort stand, is filled with mercury; on removing the finger from the jet the mercury falls into the bottle, expelling the water which rises in a fountain to a height depending upon that of the column of mercury, but rather less than is theoretically possible, the height of the fountain being ten or eleven times that of the fall of mercury. By employing mercury as the falling liquid in Hero's fountain a similar increase of effect may be obtained with that apparatus.

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Fownes' "Manual of Chemistry"

IN my review of Fownes' "Manual of Chemistry" are two mistakes which I beg to correct. On page 25, line 1, read *improbable* instead of *improvable*; and line 6, *dimorphides* instead of *isomorphides*.

THE REVIEWER

OUR ASTRONOMICAL COLUMN

THE TRANSIT OF MERCURY, MAY 6, 1878.—The transit of Mercury, which will occur on May 6 in the ensuing year, is the last during the present century in which the planet can be observed upon the sun's disc for any length of time in this country, and on that occasion the nearest approach of centres will take place only half an hour before sunset; owing, however, to the long duration of the transit, 7h. 35m. geocentric, Mercury will have been upon the disc more than four hours and a quarter when the sun sets. Reducing to Greenwich by the *Nautical Almanac* data it appears the first external contact will occur at 3h. 10m. 58s. mean time, and the first internal contact at 3h. 14m. 43s., or the planet will be 3m. 6s. in wholly entering upon the disc. The least distance of centres will occur at 7h. 0m., and sun-set at 7h. 29m. The duration of the transit is longer than in any other of this century, or indeed than in any one that has occurred since the year 1756.

Up to the present year twenty-four transits of Mercury have been more or less observed; in this number are included that of 1631, November 7, predicted by Kepler, when the planet was seen upon the sun's disc for the first time by Gassendi, at Paris, who observed on the dark-chamber method—by allowing the sun's light to pass into the room through a small aperture in the window, and throwing his image upon a white screen; that of 1651, November 3, imperfectly seen by Shakerley at Surat, and that of 1707, May 6, which was observed through clouds by Roemer at Copenhagen near the egress. Of these twenty-four transits it is singular that only eight have taken place at the descending node or in May, as will be the case next year. Two-thirds of the number have therefore occurred in November, when we might have expected the hindrances to observation to have operated unfavourably in these latitudes.

Of the three transits of the present century subsequent to 1878, that of 1881, November 7, will be wholly invisible in this country, the ingress taking place at 10h. 16m. and the egress at 15h. 37m.; in the transit of 1891, May 10, the egress occurs soon after sun-rise; and in that of 1894, November 10, it occurs near sun-set. The reader who is curious respecting the transits of Mercury in the next century may consult a communication from the Rev. S. J. Johnson to the Royal Astronomical Society in the *Monthly Notices*, vol. xxvii. p. 425; and for an account of Gassendi's long watch for the transit of 1631, and his successful observation of it, he may be referred to Prof. Grant's classical work, the "History of Physical Astronomy."

NOVA CYGNI, 1876.—Prof. Julius Schmidt mentions that the star which he first remarked on November 24, 1876 (and which is not found in the *Durchmusterung*)

diminished very regularly from January to August of the present year; it exhibited none of the slight oscillations in brightness which are still seen in T Coronæ, and we may add in other "Novæ." With the Athens refractor he has observed three small stars near the variable, with the following differences of right ascension and declination:—

13m	...	γ = Nova	- 1° 0'	...	Nova	- 45"
13	...	z = "	- 1° 6'	...	"	- 81"
12° 5'	...	x = "	+ 4° 6'	...	"	+ 20"

It will be remembered that this star suddenly shone out of 3·4 magnitude, and had diminished to the limit of naked-eye vision soon after the middle of December. Its mean place for 1880·0 is in R.A. 21h. 36m. 59·9s., N.P.D. 47° 42' 16".

COMET 1873, IV.—M. Raoul Gautier has worked out definitive elements of the comet discovered by M. Borrelly on August 20, 1873, and finds the observations best represented by an ellipse with a period of 3,277½ years, the probable errors of perihelion distance and eccentricity limiting the period between 3,012 and 3,585 years. This comet, however, was observed for one month only, or through an orbital arc of only 58°, and such results of calculation in the present case are not perhaps to be allowed any great weight. There are many other comets which we imagine would better have repaid the labour expended by M. Gautier upon Comet 1873, IV. Expressing his best *parabolic* elements in the manner adopted in catalogues of comet-orbits, we have the following figures:—

Perihelion Passage, 1873, September 10·83679 M.T. at Berlin.

Longitude of perihelion	...	36° 48' 40"	} M. Eq. 1873 0
" ascending node	...	230° 38' 4"	
" inclination	...	84° 0' 50"	
Log. perihelion distance	...	9·899956	

Motion—retrograde.

MINOR PLANETS.—A remark in this column some time since upon the probability of several discoveries of so-called new planets proving to be observations of bodies previously detected, appears to be justified by recent experience. Thus the object announced as a new planet by Prof. Watson and M. Borrelly in August last was shown by Herr Knorre, of Berlin, to be identical with No. 141, detected by M. Paul Henry at Paris, on January 13, 1875, and it is now stated that the small planet remarked by Herr Palisa at Pola on October 2 is really No. 161, which was discovered by Prof. Watson on April 18, 1876, and received the name *Athor*. As was to be expected from the rapidity with which discoveries of small planets have succeeded one another of late years, calculation is now considerably behind observation, and we are still without published elements of a number of the bodies lately brought to light.—Prof. Peters states that he has proposed the name *Idunna* for the planet discovered by him on October 14, which is No. 175, a name which he says will be understood by those members of the "Astronomische Gesellschaft" who, at their late meeting at Stockholm, participated in the hospitality of "Ydun."—There is now a strange confusion of mythologies and systems of nomenclature in the minor-planet group, a state of things that at one time might have been readily avoided.

THE ROYAL DUBLIN SOCIETY

A SCHEME for the reorganisation of this society as a branch of the National Museum of Science and Art established by the Government has been under consideration for some time, and a report of the council on the subject was submitted to the society at its meeting on November 8. The scheme includes a recommenda-

tion in favour of the amalgamation of the agricultural department of the society and the Royal Agricultural Society, under the title of the Royal Irish Agricultural Society; after some discussion the report was carried. The following are the principal points involved in the reorganisation:—

In accordance with the agreement entered into with the Government, the principal conditions of which are embodied in the "Act for the Establishment in Dublin of a Science and Art Museum and the Development of the Library of the Royal Dublin Society into a National Library," the property of the society in land, buildings, and collections has passed into the possession of the Government. The society will, in accordance with such agreement, receive the sum of 10,000*l.*, which will be invested in such security as, subject to the approval of the Treasury, may be selected; it will continue to be provided with the requisite accommodation in Leinster House; the members will have free access to the several departments as heretofore, whilst the existing members, as well as all those who shall be admitted before January 1 next, will have the right to borrow books from the National Library. In order to assist in the more complete development of that part of the society's work which is devoted to the promotion of science and the useful arts, it has been arranged that all the scientific serials and transactions of learned societies, as well as all duplicates in the library, shall remain the property of the society; the Lecture Hall and Laboratory will be reserved for its use; and the collections in the Botanic Garden and Museum of Natural History will be available as formerly for the illustration of papers read before the society. The most important condition, however, for the successful prosecution of the society's scientific work, pure as well as applied, is that for five years the cost of printing the scientific papers read before the society will be defrayed by the Government. Concessions equally favourable have been obtained for the agricultural department. Thus in lieu of the premises around Leinster House, which will be required for museum buildings, &c., the Government has undertaken to provide accommodation for agricultural shows elsewhere, and to reimburse the society for any pecuniary loss it may sustain in consequence of the change of site from the city to the suburbs. In order to develop the scientific work of the society, and thus secure to the fullest extent the great advantage of having the scientific papers read before it, printed, the Committee of Science have submitted a scheme for the complete reorganisation of the department under their superintendence. Thus, the meetings for the discussion of subjects connected with science pure and applied will be held in these sections:—1. For the physical and experimental sciences. 2. For the natural science, including geology and physical geography. 3. Science applied to the useful arts and industries. The papers to be read at these sectional meetings will be published in 8vo, as the Scientific Proceedings, the more important to be published in 4to, under the title of "Transactions." In order to consolidate and economise both work and time other scientific bodies have been invited to associate themselves with the work of the sections, the meetings of which will be held simultaneously on the third Monday of each month, an invitation to which the Royal Geological Society and the Scientific Club have responded. A special committee is now engaged in considering the measures most advisable to adopt with regard to the future of the society, so as to maintain it as an object of attraction to the educated classes, and a preliminary report has been presented to the council, in which it is advised that in addition to the more complete organisation of the scientific department steps should be taken to render the reading-rooms more efficient, to establish a lending library for the use of future as well as present members, to arrange for the delivery of lectures

for the elucidation of the latest discoveries in science, and to hold occasional *conversazioni*. According to one of the conditions contained in Lord Sandon's letter of February 9, 1876, the National Library will be placed under the superintendence of a council of twelve trustees, eight of whom are to be nominated by the Royal Dublin Society and four by the Government.

Then followed the Report of the Committees of the Royal Dublin Society and of the Royal Agricultural Society on the subject of amalgamation, which, as we have said, was adopted. The two societies will to some extent remain connected; the Agricultural Society, Lord Powerscourt stated, would be a branch of the Royal Society, though under different management.

ON THE EOCENE FLORA OF BOURNEMOUTH

DURING this last summer and autumn I have seized several opportunities of continuing my examination of the Bagshot Beds of Hampshire and the Isle of Wight, some of the results of which I think may interest your readers. This series is, as is now well known, of great importance from the fact of its being almost the only series from the tertiaries whose absolute relative geological age is positively known, it being under and overlapped on the mainland by the London clay and Bracklesham beds respectively, whilst in the Isle of Wight, occurring in a complete series of eocene strata, upheaved vertically, its true position is even still more plainly seen. It is further important as exhibiting in gradual sequence the change from an upland to a swamp flora, and represents very fairly the local flora of a long period and of an entire continent that has passed away. Of the richness and completeness of the flora an idea may be formed from the fact that I can reckon in my own collection not less than 10,000 selected specimens, many of large size, exclusive of twice that number which I have discarded, whilst there are also local collections at Bournemouth, a splendid series in the Cambridge Museum, and a scarcely less important one from Alum Bay, at the British Museum. But perhaps the most valuable discovery—to the botanist, at all events—is that of various beds containing well-preserved fruits above the horizon of the leaf-patches, identifiable with fruits from Sheppey which are found in the London clay, and therefore below the leaves. We thus appear to have at Bournemouth the leaves of trees which may be descended from those whose fruits are imbedded at Sheppey. The assistance, it will be readily seen, of the Sheppey fruits will be of the greatest value in determining the genera of the Bournemouth leaves and flowers. At Bournemouth about sixteen kinds of fruit may be collected in the seed-beds just mentioned, including *Nipadites*, *Hightea*, *Cucumites*, and *Petrophiloides*, quite sufficient to establish the fact that no break took place in the succession of the London clay flora.

The number of forms also common to Bovey Tracey is worthy of note. The most abundant fern at either locality is *Pecopteris lignitum* (now believed to be an *Osmunda*). *Palmarites dæmonorops* of Heer, from Bovey, is no other than the *Cactus* of which I have frequently made mention. The dicotyledons of Bovey ascribed to *Laurus*, *Ficus*, *Daphnogene*, *Dryandroides*, &c., appear also to be identical with those of the Bagshots, and it is therefore not at all improbable that the miocene age of the Bovey Tracey beds, determined, as it seems to me, on most slender grounds, will have to be reconsidered.

The extremely local distribution of the leaves in patches, each with its distinguishing group of plants, has again in fresh instances come prominently under my notice. At Studland, in one bed, fan palms with a three-foot radius lie massed together, but in a decomposed state; and I only succeeded by using the utmost care in extracting one specimen showing the full length of the leaf. At